Canadian Grain Commission
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Grain Research Laboratory

Quality of Western Canadian Feed Barley 1990

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Introduction

This bulletin presents a review of the conditions under which the 1990 barley crop was grown and harvested, as well as preliminary quality data for the No. 1 Canada Western grade. Since this grade annually represents a high proportion of the barley grown, the data give a good indication of the quality of the 1990 crop available for feeding purposes. The map (Figure 1) shows the major barley growing areas in Western Canada.

Figure 1. Major Barley Producing Area in Canada

Growing and Harvesting Conditions

Due to rather cool and wet conditions, barley seeding started slowly in 1990. By the end of May, 20% of the crop remained to be sown, with delays most pronounced in eastern Saskatchewan and parts of western Alberta. Barley was still being sown toward the end of June in some areas of western Alberta that had been inundated between late May and mid-June.

Growing conditions during June and July were mostly favourable, though a lack of rain in the first half of the growing season did cause some stress, and loss of yield potential, in crops in northern parts of the grain belt in Saskatchewan and adjoining areas of Alberta. These moisture deficiencies were largely erased in July and conditions for filling the crop were generally good.

August was relatively warm and dry, especially in the eastern Prairies, and the barley harvest proceeded rapidly in Manitoba, with over 50% of the crop combined by the end of the month. Further west, crops matured more slowly, with only 15% of the barley in Saskatchewan and Alberta harvested by the end of August. However, exceptionally warm, dry September weather provided ideal conditions for ripening and harvesting. As a result, concern over vulnerability to frost, due to late seeding and a relatively cool growing season, proved unfounded.

On average in the prairie region, the barley yield was the second best on record. These high yields reflected the generally adequate moisture supply through the growing season and the lack of any sustained heat stress.

Production

October crop estimates indicate that the improved weather conditions, across most of the Prairies in 1990, resulted in increased production despite a slight decrease in seeded area (Table 1). Estimates for all three prairie provinces show production figures higher than the 10-year average with the total Western Canadian barley production estimate being 6% higher than the 10-year average. Production estimates for Manitoba, Saskatchewan and Alberta show 28%, 23% and 7% increases respectively over 1989 values (Table 1). These high production figures were the result of near-record high yields which on average were 14% higher than the 10-year average.

1. Barley Production in Western Canada for 1990 and 1989[1]

	Seeded Area		Production	
	1990	1989	1990	1989
	(thousand hectares)		(thousand tonnes)	
Manitoba	627	647	1 981	1 546
Saskatchewan	1 416	1 497	3 701	3 005
Alberta[2]	2 139	2 119	6 246	5 850
Total	**4 182**	**4 263**	**11 928**	**10 401**

[1] Statistics Canada, *Field Crop Reporting Series*, No. 7, October 3, 1990
[2] Alberta figures include small amounts grown in British Columbia

Crop Quality

Timely rains and a cooler summer resulted in an improvement in the quality of this year's feed barley compared with last year. The warm, dry August and September led to few problems at harvest and so the crop will store well. Improved quality is indicated by the higher test weights, plumper kernels and lower ß-glucan levels observed in composites from all three prairie provinces (Table 2). The lower protein content of the current crop is the result of an increase in kernel plumpness and will not affect the feeding quality of the barley.

For comparison purposes, Table 3 shows quality data for shipments of No. 1 CW barley from Pacific terminal elevators (which have accounted for over 90% of Canadian feed barley exports during the past two crop years.) The quality of feed barley exported in the 1990-91 crop year will reflect the improved quality of the 1990 crop and will be superior to that of the feed barley exported during the 1989-90 crop year.

2. Analysis of Provincial Composites of Harvest Survey No. 1 CW Barley

Province	Year	Protein Content[1] (N x 6.25)	Test Weight	Plump Kernels[2]	ß-glucan Content[1]
		(%)	(kg/hL)	(%)	(%)
Manitoba	1990	12.6	64.9	75.4	4.0
	1989	13.6	64.0	57.2	4.1
Saskatchewan	1990	12.6	66.0	86.0	4.0
	1989	14.4	65.5	77.3	4.5
Alberta	1990	12.5	66.2	83.8	4.0
	1989	13.2	62.8	71.2	4.3
Western Canada[3,4]	**1990**	**12.6**	**65.9**	**83.1**	**4.0**

[1] dry matter basis
[2] over 6/64" sieve
[3] weighted average of data from individual provinces
[4] no data available for 1989

3. Analysis of Pacific Export Shipments of No. 1 CW Barley

Crop Year	No. of Cargoes	Amount Shipped	Protein Content[1] (N x 6.25)	Test Weight	Plump Kernels[2]	ß-glucan Content[1]
		(thousand tonnes)	(%)	(kg/hL)	(%)	(%)
1989-90	122	3 674	13.4	64.0	72.3	3.7
1988-89	65	2 133	12.2	67.0	73.2	4.4

[1] dry matter basis
[2] over 6/64" sieve

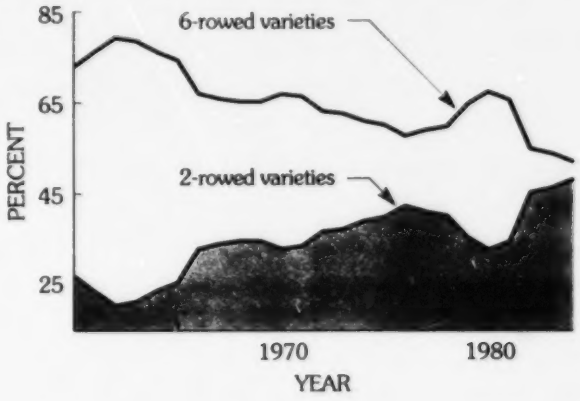
Improvement of Western Canadian Feed Barley

There has been a significant change in the amount of 2-rowed barley grown in Western Canada over the past 25 years (Figure 2). In 1967, 2-rowed barley was grown on 21% of the barley acreage but this proportion had increased to 48% by 1989. If this trend continues, feed barley for export will contain a higher proportion of 2-rowed barley with a resulting increase in barley test weight and plump kernel content.

A new feed grain research program has been established at the Canadian Grain Commission to help monitor and improve the quality of Canadian feed barley. Activities involved in this program include quality analysis of harvest survey and cargo composites, and basic research into what constitutes quality in feed grain.

A barley monitoring group continues to provide leadership and guidance for programs designed to improve the appearance and nutritional value of feed barley from Western Canada. The group has recommended the development of a program for monitoring the nutritional quality of new feed barley varieties. As a first step, the Canadian Grain Commission is investigating the quality of feed barley breeding lines grown during 1990.

Figure 2. Percentage of 6-rowed and 2-rowed Barley Grown in Western Canada (1965 to 1989)



Methods

Notes on the methods used at the Grain Research Laboratory for the collection of samples and for the quality tests on barley are given below.

Samples. Samples of harvest survey barley were submitted to the Grain Research Laboratory by the elevator managers of firms operating licensed primary elevators in Western Canada. Of the total number of samples submitted, only those qualifying for the No. 1 CW barley grade were included in this survey. For each provincial composite the number of samples selected was proportional to Statistics Canada's 5-year average estimates of production in each crop district.

Composite samples representing export cargo shipments from Pacific ports for the 1989-90 crop year were prepared from samples taken at terminal and transfer elevators during the vessel loading process.

Test Weight. The weight per hectolitre was determined with the Schopper Chondrometer using the one-litre container. Results reported were determined by dividing the weight of the grain in grams by ten.

Plump Kernels. The sample was passed over a 6/64" by 3/4" slotted sieve. Barley remaining on top of the sieve is reported as percent plump kernels.

Protein (N x 6.25). The protein content of composite samples was determined on a one-gram sample by the Kjeldahl method as modified by Williams, P.C., *Journal of the Science of Food and Agriculture* 24, 343-348, 1973. Results are reported on a dry matter basis. Individual survey samples were tested for protein content using near-infrared reflectance spectroscopy calibrated against the Kjeldahl method.

Beta-Glucan. Barley was analyzed for beta-glucan by the procedure of McCleary, B.V. and Glennie-Holmes, M., *Journal of the Institute of Brewing* 91, 285-295, 1985, combined with the glucose assay described in the *Gluco-Quant Assay* kit from Boehringer Mannheim, 11150 Cote de Liesse, Dorval, Quebec, Canada.

Acknowledgements

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